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To: study department  
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Eva Vrbkova  
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Dear Commission of defence for PhD dissertations

Thank you for your request to act as opponent for the PhD defence of Ing. Milos Fojtlin.  
I have read the provided thesis and have prepared my opponency review:

The thesis deals with an important and timely topic: assessment of the thermal environment in vehicular cabins. While the topic has been around for a long time, i.e. since the introduction of fully enclosed car environments, it has lately received a renewed interest, which is mainly driven by the drive for reduced energy consumption of cars. This is especially pertinent since the introduction of electric cars. Where before, car heating had little effect on car fuel use, given heat was a by-product of the engine, and only cooling affected energy use, with the advent of electric cars both heating and cooling requirements have an inverse impact on potential distance travelled on a single battery charge. This is a complex topic which is addressed from many angles in research. The present thesis considers the thermal comfort aspect, with the goal of better understanding and describing the thermal comfort in a car environment, enabling to describe it with simulation models, with the ultimate goal to design the control system for the car environment to a comfortable level for the occupants with minimal energy use.

A thesis cannot solve this issue within the limited time available but is expected to provide building blocks of high quality that fit in with the overall solution to the problem.

This is achieved in the present thesis, by: improving the understanding and modelling of the human-seat heat exchange interactions, improving the representation of the impact of clothing and body positions on these interactions, developing an overall seat heat transfer model, evaluating models for the assessment of measuring the heat transfers (manikins) and the translation of model outcomes into thermal sensations and comfort, and finally the design of a demonstrator set of heat flux sensors/equivalent temperature sensors, to integrate the complex cabin climate distribution into a simpler, input variable for the climate control system considering regional variations across the body. The PhD student has performed these studies clearly to a high-quality level, which is reflected in the standing and quality of the journals in which the work is published. I expect the work to have important impact on the future developments in research on car climate. The thesis is clearly structured and linguistically of an excellent quality.

In summary, I recommend the candidate to be awarded the academic degree of PhD.

I hope the above assessment is considered appropriate. I am looking forward to the actual defence and the opportunity to exchange some ideas with the candidate.

Yours sincerely

A handwritten signature in black ink, appearing to be 'G. Havenith', written in a cursive style.

Professor George Havenith  
Director Environmental Ergonomics Research Centre